

What is claimed is:

26. (New) A pressure control device in a pressure control system for maintaining a constant predetermined excess pressure arranged in a fluid dispensing container, said pressure control device comprising:

a cylinder having an open end and a closed end, and a piston movable within said cylinder defining a first chamber to be filled with a gas for exerting said predetermined excess pressure, a second chamber, a passageway from the second chamber to the outside of the device leading to the fluid dispensing container, and a valve for releasing and closing said passageway,

wherein the second chamber is formed by a high-pressure container with a closed end and an open end provided with a rim part and said high-pressure container being filled with a gas at a pressure higher than said predetermined excess pressure,

said piston having means for actuating said valve dependent from the pressure difference between the first chamber and the fluid dispensing container, so that if the fluid pressure in the fluid dispensing container drops below the predetermined excess pressure, gas flows from the second chamber to the fluid dispensing container until the container pressure approximately equals said predetermined excess pressure, and

further wherein a closure is mounted to the rim part of the high-pressure container in order to close the second chamber, wherein the first chamber is part of the closure, such that the high-pressure container encompasses the cylinder of the first chamber.

27. (New) The pressure control device as claimed in claim 26, wherein the volume of the first chamber is substantially smaller than the volume of the second chamber.

28. (New) The pressure control device as claimed in claim 26, wherein the high-pressure container is a second cylinder.

29. (New) The pressure control device as claimed in claim 26, wherein the initial pressure of the gas in the second chamber is defined by the formula:

$$P_2 \geq P_1 * (1 + V_1/V_2)$$

wherein

P_1 = the predetermined excess pressure

P_2 = the initial pressure in the second chamber

V_1 = the volume of the fluid dispensing container

V_2 = the volume of the second chamber

30. (New) The pressure control device as claimed in claim 26, wherein the closure comprises a closing element commensurate to the rim part of the high-pressure container, and means for mounting the first cylinder of the first chamber in the closure.

31. (New) The pressure control device as claimed in claim 30, wherein the upper end of the high-pressure container has a tapered neck portion.

32. (New) The pressure control device as claimed in claim 31, wherein the closure comprises a steplike funnel directed inwardly to the neck portion.

33. (New) The pressure control device as claimed in claim 30, wherein the closing element is an inner circular groove of the closure which is mounted to the rim part of the high-pressure container by means of vibration or ultrasonic welding.

34. (New) The pressure control device as claimed in claim 26, wherein the high-pressure container has a central bottom opening locked by a plug for pressurizing the second chamber with a gas.

35. (New) The pressure control device as claimed in claim 26, wherein the high-pressure container is made of a plastic material by injection blow moulding.

36. (New) The pressure control device as claimed in claim 35, wherein the high-pressure container is made of PET.

37. (New) A pressure control system comprising a pressure control device as claimed in claim 26, and a fluid dispensing container, wherein the fluid dispensing container is formed from a plastic material as a bottle and the high-pressure container is welded to the inner wall of the fluid dispensing container, whereas the inner side of the bottle and the outer side of the high-pressure container are adapted to form an interference press-fit connection.

38. (New) The pressure control system as claimed in claim 37, wherein the high-pressure container is laser welded to the inner wall of the fluid dispensing container.

39. (New) The pressure control system as claimed in claim 37, wherein the fluid dispensing container has a dispensing opening with a dispensing valve, and a movable piston is provided in the fluid dispensing container between the pressure control device and the dispensing opening, wherein said movable piston separates the fluid and the gas in the fluid dispensing container, and is movable towards the dispensing opening by the excess pressure prevailing in the fluid dispensing container.

40. (New) The pressure control system as claimed in claim 39, wherein the movable piston is designed as a dome with annular sealing ribs.

41. (New) The pressure control system as claimed in claim 40, wherein the movable piston is made of a resilient plastic material.

42. (New) The pressure control system as claimed in claim 37, wherein the fluid dispensing container has a dispensing opening with a dispensing valve, and a dip-tube is provided from the entry of the dispensing valve to the upper end of the pressure control device, in order to dispense the fluid through the dip-tube by the excess pressure prevailing in the fluid dispensing container.

43. (New) The pressure control system as claimed in claim 42, wherein the dispensing valve has a spray nozzle.

44. (New) A method for manufacturing a pressure control device for use in a pressure control system for maintaining a constant predetermined excess pressure arranged in a fluid dispensing container, said pressure control device comprising a first cylinder having an open end and a closed end, and a piston movable within said cylinder defining a first chamber to be filled with a gas for exerting said predetermined excess pressure, a second chamber, a passageway from the second chamber to the outside of the device leading to the fluid dispensing container, and a valve for releasing and closing said passageway, wherein the second chamber is formed by a high-pressure container with a closed end and an open end provided with a rim part and said high-pressure container being filled with a gas at a pressure higher than said predetermined excess pressure, said piston having means for actuating said valve dependent from the pressure difference between the first chamber and the fluid dispensing container, so that if the fluid pressure in the fluid dispensing container drops below the predetermined excess pressure, gas flows from the second chamber to the fluid dispensing container until the container pressure approximately equals said predetermined excess pressure, and further wherein a closure is mounted to the rim part of the high-pressure container in order to close the second chamber, wherein the first chamber is part of the closure, such that the high-pressure container encompasses the cylinder of the first chamber, said manufacturing method comprising:

forming the first cylinder;

forming the piston, the valve elements, the high-pressure container with the closed end and the rim part at the open end, and the closure out of a synthetic material of high stability;

forming a central opening in the bottom of the high-pressure container;

assembling the piston with a sealing ring in the first cylinder, whereas a gas is filled in the first chamber at a predetermined pressure;

mounting the first cylinder with respect to the valve, such that the actuating means of the piston is positioned correctly with respect to the valve; and

mounting the closure to the high-pressure container.

45. (New) The manufacturing method as claimed in claim 44, wherein the closure is mounted to the high-pressure container by vibration or ultrasonic welding.

46. (New) The manufacturing method as claimed in claim 44, wherein the high-pressure container is formed from a synthetic material by injection blow moulding.

47. (New) The manufacturing method as claimed in claim 46, wherein the synthetic material is PET.

48. (New) The manufacturing method as claimed in claim 44 comprising incorporating the pressure control device in a pressure control system including a fluid dispensing container wherein

the fluid dispensing container is formed;
the bottom of the fluid dispensing container is cut off; and
the high-pressure container and the fluid dispensing container are joined in their respective bottom regions.

49. (New) The manufacturing method as claimed in claim 48, wherein the fluid dispensing container is formed from a synthetic material by injection stretch blow-moulding.

50. (New) The manufacturing method as claimed in claim 48, wherein the high-pressure container and the fluid dispensing container are joined by laser welding.

51. (New) The manufacturing method as claimed in claim 50, wherein the fluid dispensing container is made of a transparent plastic material and the high-pressure container is made of a laser energy absorbing plastic material.

52. (New) The manufacturing method as claimed in claim 48, wherein the high-pressure container is pressurized with an inert gas immediately after filling the fluid dispensing container with a fluid.